

a second layer of said noble metal covering portions of said first layer of said noble metal, wherein said first layer of said noble metal is thinner than said second layer of said noble metal.

REMARKS

Reconsideration of the above-referenced application in view of the following remarks is respectfully requested.

Claims 1-16 and 21-24 are pending in this case. Claim 21 has been amended to correct grammatical mistakes.

Claim 21 stands rejected under 35 U.S.C. 102(e) as being anticipated by Lee, et al. (U.S. Patent No. 6,232,651). Applicant respectfully traverses the rejection. Claim 21 includes the feature of "a first layer of noble metal covering said leadframe; and a second layer of *said* noble metal covering portions of said first layer of said noble metal (emphasis added)." By virtue of Applicant's use of the word "said" to describe the noble metal of the second layer, the second layer is of the same metal as the first layer in Claim 21. In contrast, Lee discloses a first layer 36 of gold, platinum, or platinum alloy covering the lead frame and a layer 37 of palladium or palladium alloy covering layer 36. Note that layer 37 is a different metal than in Lee's layer 36. Therefore, Lee fails to anticipate Claim 21. Applicant respectfully requests that the rejection be withdrawn.

Claims 1-3, 5, 9 and 21-23 stand rejected under 35 U.S.C. 102(b) as being anticipated by Kim, et al. (U.S. Patent No. 5,767,574). Applicant respectfully traverses the rejection. Claim 1 includes the feature of "an adherent layer of palladium on [a] palladium film." Claim 1 also indicates that the adherent layer of palladium selectively covers areas of the leadframe suitable for bonding wire attachment and solder attachment. Kim does not teach or suggest such features. In Figure 5, Kim shows a Pd-X *alloy* layer over a strike-plated Pd layer,

not a layer of palladium on a palladium film. In addition, Applicant cannot find a teaching or suggestion in Kim of selective deposition of *any* layer. Therefore, Applicant submits that Claim 1 is patentable over Kim. Claims 2, 3, 5, and 9 depend from Claim 1 and are therefore patentable over Kim for at least the reasons presented above for that claim.

Claim 21 includes the feature of "a first layer of noble metal covering said leadframe; and a second layer of said noble metal covering portions of said first layer of said noble metal." As noted in Applicant's arguments above distinguishing Claim 21 from Lee, the noble metal of the first layer is the same as the noble metal of the second layer. In contrast, Kim (as in Lee) teaches a different metal (an alloy of palladium and another element such as Au, Co, W, Ag, Ti, Mo, and Sn) overlying a layer of palladium. Therefore, Applicant respectfully submits that Claim 21 is patentable over Kim. Claim 22 depends from Claim 21 and is therefore patentable over Kim for at least the reasons presented above.

Claim 23 includes the features of "a film of palladium on said leadframe; and a layer of palladium covering portions of said film of palladium." As indicated above with respect to Claim 21, Kim teaches an *alloy* of palladium (i.e. not palladium itself) overlying a layer of palladium. Therefore, Applicant respectfully submits that Claim 23 is patentable over Kim.

Claims 21-23 stand rejected under 35 U.S.C. 102(b) as being anticipated by Abys, et al. (U.S. Patent No. 5,360,991). Applicant respectfully traverses the rejection. Claim 21 includes the feature of "a first layer of noble metal covering said leadframe; and a second layer of said noble metal covering *portions* of said first layer of said noble metal (emphasis added)." In contrast, in Abys there is nothing to suggest that layer 25 covers only portions of layer 23 rather than the complete layer. Therefore, Applicant respectfully submits that Claim 21 is patentable over Abys. Claim 22 depends from Claim 21 and is therefore patentable over Abys for at least the reasons presented above.

Claim 23 includes the features of "a film of palladium on said leadframe; and a layer of palladium covering *portions* of said film of palladium." As indicated above with respect to Claim 21, in Abys there is nothing to suggest that layer 25 covers only portions of layer 23 rather than the complete layer. Therefore, Applicant respectfully submits that Claim 23 is patentable over Abys.

Claims 4, 6, 10, and 11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kim. Applicant respectfully traverses the rejection. Claims 4, 6, 10, and 11 depend from Claim 1. As indicated above, Kim does not teach or suggest all of the features of Claim 1. Therefore, Claims 4, 6, 10, and 11 are patentable under 35 U.S.C. 103(a) over Kim. In addition, Claim 4 includes the feature of "a stack consisting of a nickel layer in the thickness range from about 30 to 50 nm, plated onto said base metal, followed by a palladium/nickel layer in the thickness range from about 30 to 50 nm, followed by a nickel layer in the thickness range from about 1.0 to 3.0 μm ." In contrast, Kim (col. 1, line 67 to col. 2, line 3) teaches a Ni strike plated layer about 5 μ -inches thick, a Pd/Ni alloy layer about 3 μ -inches, and a Ni layer of undisclosed thickness. There is no suggestion in Kim of using layers having dimensions recited in Claim 4. Claim 6 includes the feature "wherein said palladium layer has a thickness from about 70 nm to 90 nm." As indicated above, Kim's layer 54 in Figure 5 is not a palladium layer. With respect to Claim 11, Applicant again points out that "reflow temperature" is a physical characteristic of the solder layer and is therefore not a process limitation.

Claims 8 and 12-16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Tsuji, et al. (U.S. Patent No. 5,521,432). Applicant respectfully traverses the rejection. Claim 8 depends from Claim 1. As indicated above, Kim does not teach or suggest all of the features of Claim 1. Tsuji's teaching of a lead frame made of nickel partially plated with palladium does not cure the above-cited defects of Kim. One skilled in the art would receive no motivation from either Kim or Tsuji for a combination of the teachings

and suggestions therein to arrive at the features described in Claims 1, 7, or 8. Therefore, Applicants respectfully submit that Claim 8 is patentable over the combination of Kim and Tsuji. Similarly to Claim 11, Applicant again points out that providing visual distinction is a characteristic of the palladium layer and is therefore not a process limitation.

Claim 12 includes the features of "said leadframe further having an adherent layer of palladium on said palladium film, selectively covering said second ends of said lead segments in a thickness suitable for solder attachment, and further selectively covering the bonding wire attachment areas on said first ends of said lead segments in a thickness suitable for bonding wire attachment" As indicated above with respect to Claim 1, Kim does not teach or suggest an adherent layer of palladium on a palladium film. Tsuji does not cure that deficiency of Kim. Note also that neither Kim nor Tsuji teach or suggest selective deposition of palladium in bonding wire attachment areas of lead segments. In Tsuji's Figures 8 and 9, bonding areas 23 are shown differently than are areas 21. In column 6, at lines 48-54, Tsuji specifies that areas 23 are either silver or gold, not palladium. Claims 13-16 depend from Claim 12 and are therefore patentable for at least the reasons presented above for that claim.

Applicant thanks the Examiner for indicating the allowability of Claims 7 and 24, but in view of Applicant's arguments above regarding the patentability of the claims from which Claims 7 and 24 depend, Applicant respectfully declines to rewrite those claims in independent form at this time.

Rebuttal to Examiner's Response to Arguments

The Examiner argues that "because of using the term "comprising" [in Claims 1 and 12], the layer of Pd as claimed does not exclude the presence of other elements. Therefore, Pd-X alloy layer is a layer of Pd as claimed." Applicant submits that the Examiner is improperly construing Applicant's usage of the word "comprising." Note that "comprising" only appears in Claims 1 and

12 in the preamble of those claims. Therefore, the subject of "comprising" in Claim 1 is the leadframe, and in Claim 12 the subject of "comprising" is the semiconductor device. Note that the claim does *not* say that the adherent layer comprises palladium in Claim 1 or that the leadframe has an adherent layer film comprising palladium in Claim 12. Rather, Claim 1 says simply "an adherent layer of palladium on said palladium film." And Claim 12 says simply "said leadframe further having an adherent layer of palladium on said palladium film." The term "comprising" plays no part in these features of the claims.

The Examiner also argues that "selective" is a process limitation. Applicant disagrees. By saying that a layer selectively covers another layer, one is simply pointing out that the layer does not cover all of the other layer, but that it covers only portions of the layer. Thus the term "selective" describes the covering layer, it does not necessarily only describe the process used for applying the covering layer.

The Examiner argues that the thickness of Kim's nickel layer 34 is not critical, whereas the passage at col. 1, lines 60-62 in Kim suggests otherwise. In any event, Applicant has pointed out in the arguments above the distinguishing features of Claim 4 over Kim.

Applicant has addressed the issue of whether "reflow temperature" and "visual distinction" are process limitations or not in the arguments above. Applicant submits that those terms are characteristics of claimed features, not processes by which they are made.

In view of the above, Applicant respectfully requests the entry of this amendment, the withdrawal of the Examiner's rejections, and allowance of Claims 1-16 and 21-24. If the Examiner has any questions or other correspondence regarding this application, Applicant requests that the Examiner contact Applicant's attorney at the below listed telephone number and address.

Respectfully submitted,



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Version with Markings to Show Changes Made

Claims

21. (amended) A semiconductor device, comprising:

a leadframe, comprising:

a first layer of noble metal covering said leadframe; and

a second layer of said noble metal covering portions of said first layer of said noble metal, wherein said first layer of said noble metal is thinner than said second layer of said noble metal.